active layer 30. A p-type electrode 50 and an n-type electrode 60 are formed to electrically contact the p-type semiconductor layer 40 and the n-type semiconductor layer 20, respectfully. The p-type electrode 50 includes a first metallic layer 51 a second metallic layer 52. A first metal and a second metal of the p-type electrode 50 are sequentially stacked on the capping layer 42, thereby forming the first and second metallic layers 51 and 52. The first metallic layer 51 makes contact with the capping layer 42, and the second metallic layer 52 reflects light generated by the active layer 30. The first and second metallic layers 51 and 52 are formed by thermally processing the p-type electrode 50 in a stabilized non-oxygen atmosphere in this exemplary embodiment. The thermal processing results in the first metallic layer 51 making good ohmic contact with the capping layer 42, and the second metallic layer 52 becoming a solid solution. The exemplary thermal processing temperature is between 80°C and 350°C inclusive.

Claim 11 broadly encompasses the exemplary embodiment of the invention and recites among other elements, thermally processing the first and second metallic layers in a non-oxygen atmosphere at a temperature between 80°C and 260°C, inclusive, and stabilizing the first and second metallic layers.

*Uemura* discloses a light emitting diode comprising a first metal layer containing silver formed on a p-type semiconductor layer (see col. 3, lines 52-54). A second metal layer, which does not contain silver, is formed over the first metal layer (see col. 5, line 39 through col. 6, line 34). *Uemura* further discloses that the first metal layer can be formed as a laminate of a plurality of layers comprising a first adhesive layer of nickel, cobalt, gold, palladium, or platinum that can enhance the adhesive property between the p-type semiconductor layer and the silver based

layer (see col. 4, lines 15-27). In order to reduce the interfacial resistance between the first metal layer and the p-type semiconductor layer, heating is performed in a range of 400°C to 700°C before the second metal layer is formed (see col. 6, col. 7, lines 47-61). *Uemura* discloses that if heating at a high temperature is performed after the formation of the second metal layer, silver is defused to the second metal layer and may migrate to the surface of the second electrode layer (see col. 7, lines 52-67). The Examiner acknowledges that *Uemura* fails to disclose or suggest at least that the first and second metallic layers are thermally processed at a temperature between 80°C and 260°C, as recited in claim 11, and relies on *McCormick* to remedy this deficiency.

*McCormick* discloses an *organic* electroluminescent device 260 comprising a light emitting structure 220 disposed between a first electrode 210 and second electrode 230. The light emitting structure 220 is in electrical communication with both electrodes 210 and 230. A non-conductive layer 240 defines an opening 200 that is positioned in an area of the second electrode 230. A conductive layer 250 is in electrical communication with the second electrode 230 through the opening 200. The non-conductive layer 240 is an adhesive layer that laminates the conductive layer 250 to the first electrode 210, and is made of organic materials such as a polymeric material.

The Examiner alleges that *McCormick's* light emitting device contains a first metallic layer and a second metallic layer that are thermally processed at a temperature 100°C. Applicant refutes this position. First, the second electrode 230 of *McCormick* does not correspond to the first metallic layer as recited in claim 11. This second electrode 230 is an electrode formed on the light emitting structure 220

that is comprised of organic materials and not semiconductor materials. In other words, *McCormick* discloses an organic electroluminescent device and not a semiconductor light emitting device. See Figs. 3-4; paragraph [0051].

Second, Applicant submits that the conductive layer 250 of *McCormick* does not correspond to the second metallic layer as recited in claim 11. The conductive layer 250 is a layer that encapsulates the second electrode 230 and the organic light emitting structure 220 so that these components (220, 230) are protected from moisture and oxygen. See Figs. 3-4; paragraphs [0034], [0042]. At paragraph [109], *McCormick* discloses, that the lamination temperature of the adhesive layer 240 is kept below 100 °C, particularly below 60°C, to reduce the likelihood of damage to the device layers. Applicant adds that the 100°C temperature of *McCormick* is not a thermal processing temperature of a metallic layer on a p-type semiconductor layer, but a lamination temperature of the non-conductive layer or adhesive layer 240 to soften or melt this layer. Moreover, the 100°C temperature of *McCormick* is used to reduce the likelihood of damage to layers such as the light emitting structure or layer 220, which is made of organic materials and is thereby sensitive to heat. This disclosure would not have application for a semiconductor device such as disclosed in *McCormick*. For at least these reasons, *McCormick* fails to remedy the deficiency of *Uemura*.

In the event the Examiner believes that *Uemura* and *McCormick* as combined disclose and suggest all the elements recited in claim 11, which Applicant believes they do not, these references still lack the requisite motivation for their combination. In particular, the device as disclosed by *Uemura* is a Group III-nitride compound semiconductor light emitting device. Therefore, even if heat treatment is performed

at a temperature over 100°C, which is contrary to the teachings of *McCormick*, the device layers of *Uemura* will not be damaged. Damage will not be realized in *Uemura* because *Uemura* discloses that the heating temperature required is preferably in a range of 400 to 700°C. See col. 7, lines 59-61. Even if heating is performed at around 600°C, there is no likelihood of damage to the device layers of *Uemura*. See col. 9, lines 25-41. For at least these reasons, there is no motivation to lower the thermal treatment temperature of Uemura, and therefore no reason to combine the *Uemura* and *McCormick* references. In fact, based on the aforementioned teachings, it appears that the intended purpose and/or objective of *Uemura* would be destroyed if combined with *McCormick*. Accordingly, a *prima facie* case of obviousness has not been established.

In summary, *Uemura* and *McCormick* either singularly or combined fail to disclose or suggest at least thermally processing the first and second metallic layers in a non-oxygen atmosphere at a temperature between 80°C and 260°C inclusive and stabilizing the first and second metallic layers, as recited in claim 11.

To establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Moreover, obviousness "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion of the combination." *ACS Hospital Systems v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). For at least these reasons, Applicant respectfully requests that the rejection of claim 11 under 35 U.S.C. §103 be withdrawn, and this claim be allowed.

Claims 19 and 20 depend from claim 11. By virtue of this dependency, Applicant submits that these claims are allowable for at least the same reasons given above with respect to claim 11. In addition, Applicant submits that claims 19 and 20 are further distinguishable over *Uemura* and *McCormick* by the additional elements recited therein. Applicant respectfully request, therefore, that the rejection of claims 19 and 20 under 35 U.S.C. §103 be withdrawn, and these claims be allowed.

Based on at least the foregoing amendments and remarks, Applicant submits that claims 11, 19, and 20 are allowable, and this application is in condition for allowance. Accordingly, Applicant requests a favorable examination and consideration of the instant application. In the event the instant application can be placed in even better form, Applicant requests that the undersigned attorney be contacted at the number below.

Respectfully submitted,

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